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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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20277	7590	04/22/2004	EXAMINER	
MCDERMOTT WILL & EMERY 600 13TH STREET, N.W. WASHINGTON, DC 20005-3096			DUONG, THOI V	
			ART UNIT	PAPER NUMBER
			2871	

DATE MAILED: 04/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/512,107

Applicant(s)

KUMAGAI ET AL.

Examiner

Thoi V Duong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-6, 13 and 16-18 ~~is~~are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3, 5, 6 and 18 ~~is~~are allowed.
- 6) ☒ Claim(s) 2, 4, 13, 16 and 17 ~~is~~are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 24, 2000 has been entered.

Accordingly, claims 2, 3, 13, 16 and 17 were amended, and claims 1, 7-12, 14 and 15 were cancelled. Currently, claims 2-6, 13 and 16-18 are pending in this application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuda et al. (US 6,262,783 B1) in view of Shimada et al. (US 6,052,162) and Mei et al. (USPN 6,140,668).

As shown in Figs 1 and 2, Tsuda discloses a reflection type liquid crystal display comprising:

a transparent insulating substrate 201;

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scanning lines 204, a scanning electrode 203, and common electrode 205 wiring formed on said insulating substrate;

an insulating film 207 formed on said scanning lines, said scanning electrode and said common electrode wiring;

a semiconductor layer 208 (see also Fig. 3C) formed on said scanning electrode through said insulating film;

a first electrode 212 and a second electrode 213 forming a semiconductor element with said semiconductor layer, and signal lines 211 connected to said first electrode;

an interlayer photosensitive insulating film 240 which is formed on said first electrode, said second electrode and said signal lines, absorbs difference in level of said scanning lines, said first electrode, said second electrode and said signal lines, and possesses minute unevenness on the surface (col. 9, lines 12-25) serving as an inseparable pattern on the surface (Fig. 2);

a first transparent substrate 201 (col. 1, lines 52-54) having a reflex picture element electrode 423 composed of a high reflex metal film Al (col. 9, lines 47-50) having a configuration transferred to said interlayer insulating film as the unevenness on the surface of said interlayer insulating film and electrically connected to said second electrode through a contact hole provided in said interlayer insulating film (Fig. 5B) and serving as a separable pattern; and

a second transparent substrate 301 sandwiching and holding a liquid crystal material 250 with said first substrate (col. 1, lines 52-54), which is provided with a color filter 303, an opposed electrode 303 and so on.

Tsuda et al. discloses a reflection type liquid crystal display that is basically the same as that recited in claim 13 except for an interlayer insulating film composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength, and a semiconductor film composed of the same film as said semiconductor layer and formed in a picture element region excluding the region where said scanning lines, said signal lines and said contact holes are formed.

At first, as shown in Fig. 2, Shimada et al. discloses a liquid crystal display comprising an interlayer insulating film 38 composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength so as to increase the brightness of the display (col. 5, lines 38-42 and col. 9, lines 29-48). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the reflection type liquid crystal display of Tsuda et al. with the teaching of Shimada et al. by forming an interlayer insulating film 38 composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength to improve the display brightness.

Further, as shown in Figs. 7 and 10, Mei et al. discloses a liquid crystal display comprising an a-Si semiconductor layer 64 (as 52 in Fig. 4; col. 4, lines 39-41) and an a-Si semiconductor film 68 which is provided to improve absorption of the UV radiation during lithography process for forming a channel region of the display (col. 2, lines 30-

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36 and col. 6, lines 45-55). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the liquid crystal display of Tsuda et al. with the teaching of Mei et al. by forming a semiconductor film composed of the same film as said semiconductor layer in a picture element region excluding the region where said scanning lines, said signal lines and said contact holes are formed to improve absorption of the UV radiation during lithography process.

As to the product-by-process limitations "wherein the unevenness is formed by exposure only from a front side" and "said inseparable pattern and separable pattern are arranged respectively in different masks and exposed separately; and said inseparable pattern is exposed with a predetermined exposure amount of 20 to 80% of the exposure amount for said separable pattern", it has been recognized that "Even through product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art product was made by a different process". *In re Thorpe*, 227 USPQ 964,966 (Fed. Cir. 1985). See also MPEP 2113.

4. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuda et al. (US 6,262,783 B1) in view of Shimada et al. (US 6,052,162), Sawayama et al. (USPN 6,184,960 B1) and Kiryu et al. (US 5,368, 962).

As shown from Figs. 3A to 5D Tsuda et al. discloses a method for manufacturing a reflection type liquid crystal display wherein two transparent insulating substrates 201

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and 310, in which an electrode is formed on at least one of them, are arranged to be opposite and adhered to each other and a liquid crystal material 250 is held between said two transparent insulating substrates, the method including the steps of:

forming scanning lines (not shown), a scanning electrode 203, and common electrode wiring 205 on a transparent insulating substrate 201;

forming an insulating film 207 on said scanning lines, said scanning electrode and said common electrode wiring;

forming a semiconductor layer 208 on said scanning electrode through said insulating film;

forming a first electrode 212 and a second electrode 213 forming a semiconductor element 230 with said semiconductor layer (see Fig. 2), and forming signal lines 211;

forming an interlayer insulating film 240 having a contact hole at a predetermined position and desired unevenness on the surface by applying photosensitive resin on said first electrode, said second electrode and said signal lines, and conducting exposure using a mask and development (Fig. 4B and col. 8, line 66 through col. 9, line 25); and

forming a reflex picture element electrode 423 having a configuration of transferred unevenness on the surface of said interlayer insulating film and electrically connected to said second electrode through said contact hole by forming a high reflex metal film (Al) on said interlayer insulating film and in said contact hole, and conducting patterning (Fig. 5D and col. 9, lines 46-54).

Tsuda et al. discloses a reflection type liquid crystal display that is basically the same as that recited in claim 16 except for forming an interlayer insulating film composed of a photosensitive positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength; having the exposure for forming the unevenness on the insulating film conducted only from a front side; and sticking an ultraviolet-cut film on a face of the transparent insulating film opposite to the face where said photosensitive positive-type resin is applied.

As shown in Fig. 2, Shimada et al. discloses a liquid crystal display comprising an interlayer insulating film 38 composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength so as to increase the brightness of the display (col. 5, lines 38-42 and col. 9, lines 29-48). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the reflection type liquid crystal display of Tsuda et al. with the teaching of Shimada et al. by forming an interlayer insulating film composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength so as to improve the display brightness (col. 5, lines 38-42 and col. 9, lines 29-48).

Further, Sawayama et al. discloses a method of making a reflective type LCD in which the exposure for forming unevenness on a photosensitive resin 24 is conducted only from a front side as shown in Figs. 7A-7I (col. 5, lines 28-44). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the reflection type liquid crystal display of Tsuda et al. with the teaching

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of Sawayama et al. by having the exposure for forming the unevenness on the insulating film conducted only from a front side so as to obtain a substrate with a reflective electrode by a simple method without corroding the electrode (col. 15, lines 45-51).

Finally, Kiryu discloses a masking film comprising a peelable, transparent ultraviolet-cut film provided on a transparent substrate for cutting ultraviolet rays having a wavelength of 450 nm or less (col. 2, lines 33-40). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the method of Tsuda with the teaching of Kiryu by sticking an ultraviolet-cut film on a face of the transparent insulating substrate opposite to the face where said photosensitive positive-type resin is applied for cutting ultraviolet rays having a wavelength of 450 nm or less to improve the display workability during exposure to actinic light in the photomechanical reproduction process (col. 1, lines 10-16 and 38-41).

5. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuda et al. (US 6,262,783 B1) in view of Shimada et al. (US 6,052,162) and Sawayama et al. (USPN 6,184,960 B1).

As shown in Figs. 1 and 2, Tsuda et al. discloses a method for manufacturing a reflection type liquid crystal display wherein two transparent insulating substrates 201 and 301, in which an electrode 423 is formed on at least one of them, are arranged to be opposite and adhered to each other and a liquid crystal material 250 is held between said two transparent insulating substrates, the method including the steps of:

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forming scanning lines 204 , a scanning electrode 203, and common electrode wiring 205 on the transparent insulating substrate 201,

forming an insulating film 207 on said scanning lines, said scanning electrode, and said common electrode,

forming a semiconductor layer 208 (see also Fig. 3C) on said scanning electrode through said insulating film;

forming a first electrode 212 and a second electrode 213 forming a semiconductor element with said semiconductor layer, and forming signal lines 211;

Further, as shown in Figs. 4A-4C, the method of Tsuda et al. includes the step of forming an interlayer insulating film 420 having a contact hole at a predetermined position and desired unevenness on the surface by applying photosensitive resin and conducting exposure using a mask and development (col. 9, lines 1-25).

Furthermore, as shown in Figs. 5A-5D, the method of Tsuda et al. includes the steps of

forming another interlayer insulating film 422 having desired unevenness on the surface of another predetermined position by conducting exposure at a different exposure amount using another mask on said resin and development (col. 9, lines 26-45); and

forming a reflex picture element electrode 423 having a configuration of the transferred unevenness on the surface of said interlayer insulating film and electrically connected to said second electrode through said contact hole by forming a high reflex

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metal film (Al) on said interlayer insulating film and in said contact hole, and conducting pattern (col. 9, lines 46-54).

Tsuda et al. discloses a reflection type liquid crystal display that is basically the same as that recited in claim 17 except for forming an interlayer insulating film composed of a photosensitive positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength; and for having the exposure for forming the unevenness on the insulating film conducted only from a front side.

As shown in Fig. 2, Shimada et al. discloses a liquid crystal display comprising an interlayer insulating film 38 composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength so as to increase the brightness of the display (col. 5, lines 38-42 and col. 9, lines 29-48). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the reflection type liquid crystal display of Tsuda et al. with the teaching of Shimada et al. by forming an interlayer insulating film composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength so as to improve the display brightness (col. 5, lines 38-42 and col. 9, lines 29-48).

Further, Sawayama et al. discloses a method of making a reflective type LCD in which the exposure for forming unevenness on a photosensitive resin 24 is conducted only from a front side as shown in Figs. 7A-7I (col. 5, lines 28-44). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the reflection type liquid crystal display of Tsuda et al. with the teaching

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of Sawayama et al. by having the exposure for forming the unevenness on the insulating film conducted only from a front side so as to obtain a substrate with a reflective electrode by a simple method without corroding the electrode (col. 15, lines 45-51).

6. Claims 2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sawayama et al. (USPN 6,184,960 B1) in view of Shimada et al. (US 6,052,162) and Takatsu et al. (USPN 5,434,026).

As shown from Figs. 5A and 5B, Sawayama et al. discloses a method for manufacturing a reflection type liquid crystal display, comprising:

forming plural scanning lines 10 and plural signal lines 11 crossing said scanning lines on an insulating substrate; and

forming a switching element 17 in each of picture element regions divided by said scanning lines and said signal lines.

As shown in Figs. 7A-7I, the method of Sawayama et al. further includes the step of forming an interlayer insulating film 29 having appropriate unevenness of an inseparable pattern in the picture element region and having a contact hole 42 of a separable pattern on a drain electrode 19 of said switching element by plainly applying a photosensitive insulating resin on said substrate so as to dissolve difference in level caused by said scanning lines, said signal lines, and said switching element, and conducting exposure and development while changing an amount of exposure (col. 15, lines 32-44); and

the step of forming a reflex picture element electrode 4 having unevenness due to said interlayer insulating film at a position conforming to each of the picture element regions and which is electrically connected to said switching element through said contact hole, by patterning after forming a high reflex film on said interlayer insulating film (Fig. 7I),

wherein in the process of forming the interlayer insulating film, the insulating resin is exposed by divisional (split) exposure in which the inseparable pattern and the separable pattern are exposed by different masks as shown in Figs. 6A, 6B, 7C and 7G; and

wherein the exposure for forming unevenness on the interlayer insulation film is conducted only from a front side.

Sawayama et al. discloses a method for manufacturing a reflection type liquid crystal display that is basically the same as that recited in claims 2 and 4 except for forming an interlayer insulating film composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength; for having the exposure for forming the unevenness on the insulating film conducted only from a front side; and for the exposure value of the separable pattern and the inseparable pattern.

As shown in Fig. 2, Shimada et al. discloses a liquid crystal display comprising an interlayer insulating film 38 composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength so as to increase the brightness of the display (col. 5, lines 38-42 and col. 9, lines 29-48). Thus,

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it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the reflection type liquid crystal display of Tsuda et al. with the teaching of Shimada et al. by forming an interlayer insulating film 38 composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength to improve the display brightness.

Further, Takatsu et al. discloses a quick and accurate method of determining exposure conditions for an exposure device such as a stepper for manufacturing a liquid crystal display device (col. 1, lines 12-19). As shown in Fig. 1C, a photoresist layer at position b1 is exposed to light intensity of 20 and a photoresist layer at position a1 is exposed to light intensity of 75 so as to obtain an accurate film reduction (col. 3, lines 24-27 and col. 4, lines 27-31). Accordingly, the photoresist layer at position b1 is exposed by a predetermined exposure amount of 27 % of the exposure amount for the photoresist layer at position a1. Thus, it would have been obvious that the method of Takatsu et al. is applicable for predetermining exposure conditions for the separable pattern and the inseparable pattern so as to obtain a desired insulating resin having appropriate unevenness of the inseparable pattern in the picture element region and having a contact hole of the separable pattern (col. 3, lines 24-27 and col. 4, lines 27-31).

Allowable Subject Matter

7. Claims 3, 5, 6 and 18 are allowed.

The following is an examiner's statement of reasons for allowance: none of the prior art of record fairly suggests or shows all of the limitations as claimed. Specifically,

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Re claims 3 and 5, none of the prior art of record discloses, in combination with other limitations as claimed, a mask for manufacturing a reflection type liquid crystal display comprising a base material and a shading material of at least two layers provided on said base material, said at least two layers including an ultraviolet filter for cutting ultraviolet rays at a predetermined value of 20 to 80 %.

The most relevant references, USPN 5,368,962 of Kiryu et al. and USPN 5,994,157 of Aggas et al., fail to disclose or suggest an ultraviolet filter for cutting ultraviolet rays at a predetermined value of 20 to 80 %. The reference of Kiryu et al. discloses a mask having a shading material comprised of at least two layers which include an ultraviolet filter layer; however, the UV rays are to be cut at a value of more than 99% ((col. 3, lines 34-45). Meanwhile, the reference of Aggas et al. discloses only an UV blocking layer formed of a-Si and having a thickness of from about 200 to 2000 Angstrom for cutting ultraviolet rays at about 80% (col. 7, lines 7-31).

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

8. Applicant's arguments filed February 05, 2004 have been fully considered but they are not persuasive.

Re claim 13, Applicant argued that the claimed structure resulting from the exposure only from the front side is neither taught nor suggest by Tsuda in view of

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Shimada. The Examiner disagrees with Applicant's remarks since claim 13 is a device claim, where "the unevenness is formed by exposure only from a front side" recited in the claim is the product-by-process limitation. The patentability of a product does not depend on its method of production; therefore, this product-by-process limitation is not given any patentable weight.

Re claims 2, 4, 16 and 17, Applicant's arguments are moot in view of the new ground(s) of rejection as shown above.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thoi V. Duong whose telephone number is (571) 272-2292. The examiner can normally be reached on Monday-Friday from 8:30 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim, can be reached at (571) 272-2293.

Thoi Duong



04/13/2004



**DUNG T. NGUYEN
PRIMARY EXAMINER**